



WELLS + ASSOCIATES

MEMORANDUM

TO: Brad Elmer
The Alexander Company

FROM: Martin J. Wells, P.E.
Kevin R. Fellin
John F. Cavan IV

SUBJECT: Preliminary Traffic Assessment
Lorton Town Center
Fairfax County, Virginia

DATE: October 31, 2008

INTRODUCTION

This memorandum presents the results of a preliminary traffic assessment of Lorton Town Center in Fairfax County, Virginia. The subject site is the former Lorton Prison, which is located west of Silverbrook Road (Route 600) and south of White Spruce Way, as shown on Figure 1.

The Alexander Company proposes to re-develop the site with the following mix of uses:

- 59,000 square feet (S.F.) of retail space,
- 153 townhomes,
- 198 multi-family dwelling units, and
- 114,000 S.F. of office space.

The Alexander Company's conceptual site plan is shown on Figure 2. Primary access would be oriented to Silverbrook Road at White Spruce Way. A second planned connection to Silverbrook Road would be located approximately 600 to 700 feet to the south of the White Spruce Way intersection. A potential secondary roadway link would connect the site to Lorton Road and Laurel Crest Drive to the south and west, respectively.

This study evaluates: (1) future delays, levels of service, and queues at two existing key intersections and (2) the potential need for an additional site access point and/or new roadway link connection. Build-out of the site was assumed to occur by 2012.

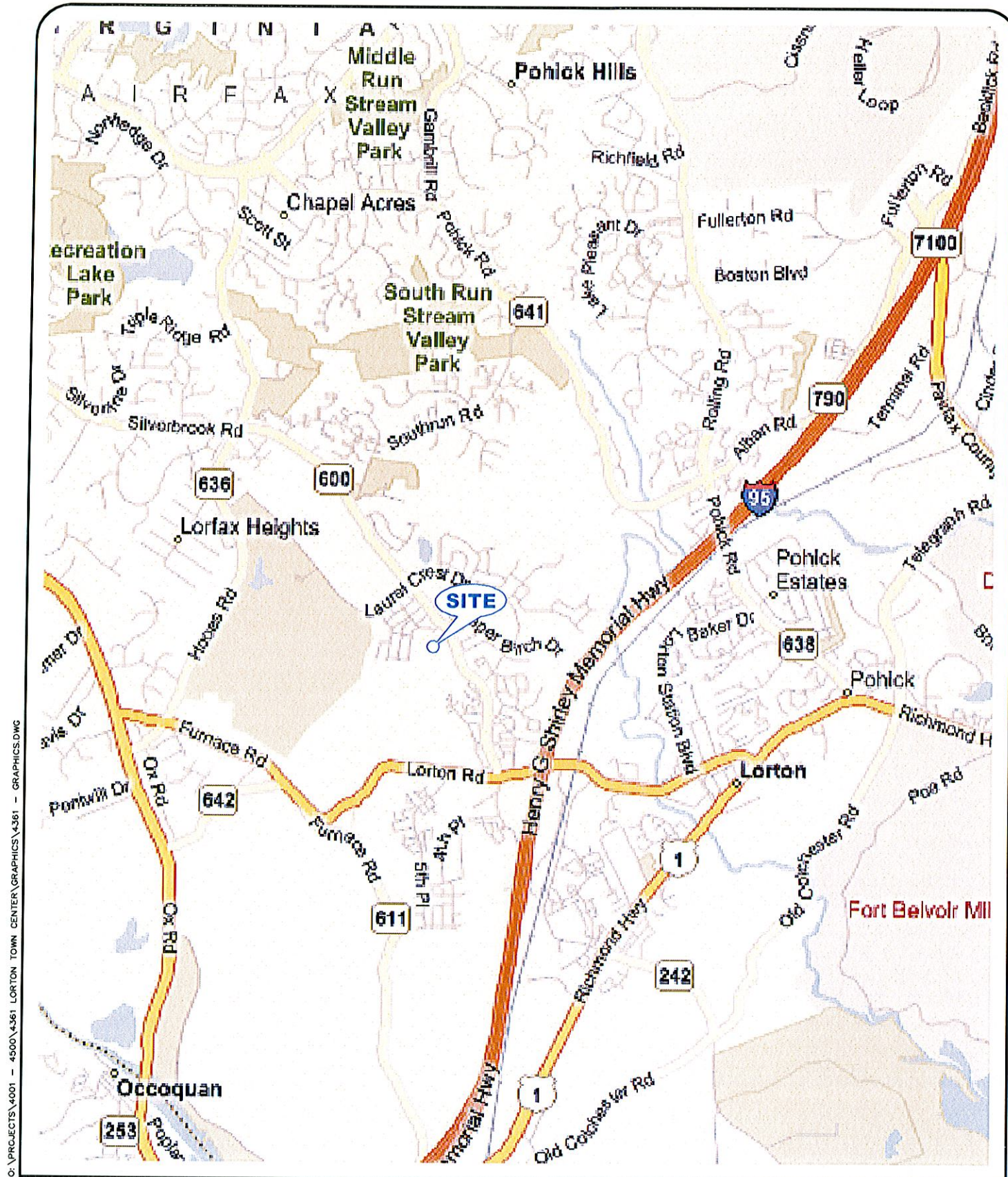


Figure 1
Site Location Map



North

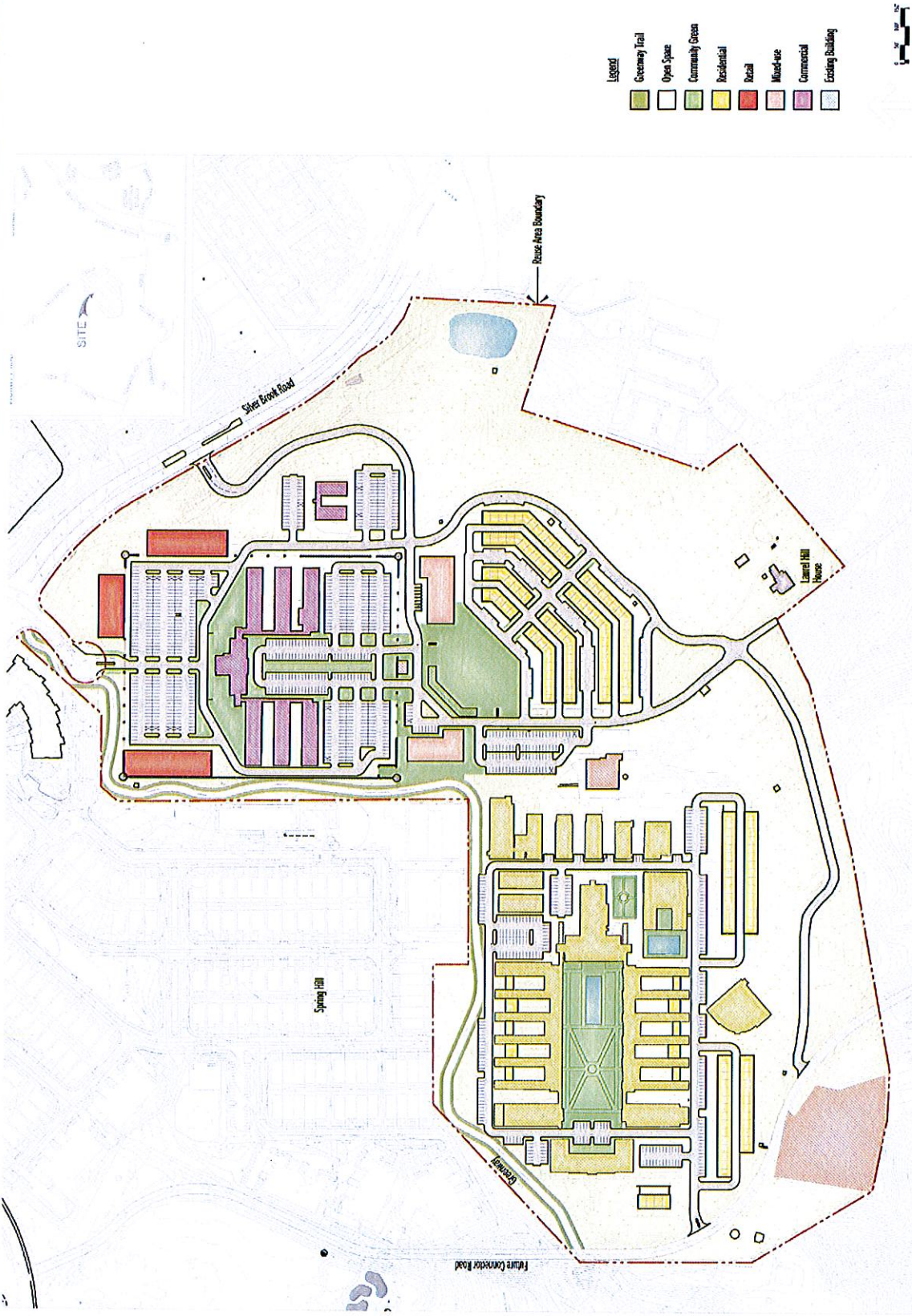


Figure 2
Site Plan Reduction

BACKGROUND

Existing Roadway Network. The site is served by a network of public streets and roadways. Regional access is provided via Silverbrook Road, which is a four-lane, divided, minor arterial (Type B) with a posted speed limit of 35 mph. This roadway connects Route 123 to the west to Lorton Road to the south. The Silverbrook Road/Laurel Crest Drive intersection operates under signal control and the Silverbrook Road/White Spruce Way intersection operations with stop control on the side streets.

Existing Transit Service. The site area is served by Fairfax Connector Route 307 "Laurel Hill/Lorton Line". Route 307 provides weekday transit service between the Laurel Hill community, Lorton VRE Station, and the Lorton Park-and-Ride Lot. Average headways are approximately 30 minutes during the morning and afternoon peaks.

Existing Traffic Counts. Existing weekday AM and PM peak hour traffic counts were conducted on Tuesday, February 1, 2005, by Wells + Associates at the following locations:

1. Silverbrook Road/Laurel Crest Drive
2. Silverbrook Road/White Spruce Way

The baseline peak hour counts are shown on Figure 3. Existing lane use and traffic controls are shown on Figure 4.

Pipeline Trips. The following adjacent (pipeline) developments were not developed and/or occupied as of the count date:

- South County Secondary School located in the northwest quadrant of the Silverbrook Road/Laurel Crest Drive intersection:
 - 880 Student Middle School
 - 2,064 Student High School
- Pulte Homes - Spring Hill development located immediately north of the former Lorton Prison site:
 - Approximately 181 Townhouses in a gated community
- Pulte Homes – Laurel Hills located on the east side of Silverbrook Road in the vicinity of the subject site:
 - 582 Single-Family Detached residential units
 - 150 Condominium/Townhouse residential units
 - 500 Student Elementary School

The location of each pipeline development is shown on Figure 5.



Figure 3
Existing 2005 Peak Hour Turning Volumes

AM PEAK HOUR
PM PEAK HOUR
000/000





Figure 4
Existing Lane Use and Traffic Controls

- ← Represents One Travel Lane
- Signalized Intersection
- Stop Sign





Figure 5
Location of Pipeline Developments



BACKGROUND FUTURE TRAFFIC FORECASTS

In order to develop future background traffic forecasts (or future traffic forecasts without the proposed development), a composite of existing traffic volumes, regional growth factors, and pipeline development trips was generated.

To account for regional growth along the Silverbrook Road corridor, a growth rate of one (1) percent was applied for seven (7) years to the through traffic movements on Silverbrook Road at the two key study intersections. The results are shown on Figure 6.

The number of trips that will be generated by the three (3) pipeline developments is shown in Table 1. As shown on Figure 7, the pipeline trips were assigned to the roadway network based on existing travel patterns, engineering judgment, and previous traffic studies.

The background traffic forecasts shown on Figure 8 are a composite of existing traffic counts (Figure 3), regional growth (Figure 6), and pipeline development trips (Figure 7).

BACKGROUND FUTURE LEVELS OF SERVICE

Future background peak hour levels of service were estimated at two (2) key study intersections based on the existing lane use and traffic controls (Figure 4), background future forecasts (Figure 8), and the Highway Capacity Manual (HCM) 2000 methodologies for unsignalized and signalized intersections as reported by Synchro version 7.0. The results are summarized in Table 2.

As shown on Table 2, the signalized Silverbrook Road/Laurel Crest Drive intersection would operate at an overall acceptable level of service (LOS) "C" or better during both weekday peak hours. The eastbound left-thru lane group at the Silverbrook Road/White Spruce Way intersection would operate near capacity (LOS "E") during the weekday PM peak hour. The VDOT signal timing operation in this corridor inherently provides a majority of green time to the mainline thus sacrificing side street performance.

SITE TRIP GENERATION

The volume of trips generated by the proposed mixed-use development was estimated using the Institute of Transportation Engineers (ITE), Trip Generation, 7th edition, rates/equations, as shown in Table 3. Given the mixed-use nature of the project, some of the site-generated trips would be captured within the site due to synergy among complimentary uses. For example, some of the townhouse residents would shop at the on-site stores. As a result, the number of peak hour trips entering and leaving the site would be reduced. The internal trip interactions are summarized on Table 3 and shown on Figures 9 through 11 for AM peak hour trips, PM peak hour trips, and average daily trips, respectively.



Figure 6
Regional Traffic Growth (7 years @ 1% Compounded Annually)

AM PEAK HOUR
000/000
PM PEAK HOUR



Table 1
Lorton Town Center
Pipeline Trip Generation Summary¹

Land Use	Land Use Code	Amount	Unit	Weekday						Average Daily Traffic
				AM Peak Hour		PM Peak Hour		Total		
				In	Out	In	Out			
<u>South County Secondary School</u>										
Middle School	522	880	Students	257	210	467	69	63	132	1,426
High School	530	<u>2,064</u>	<u>Students</u>	<u>491</u>	<u>220</u>	<u>711</u>	<u>136</u>	<u>153</u>	<u>289</u>	<u>3,110</u>
Subtotal		2,944	Students	748	430	1,178	205	216	421	4,536
<u>Pulte Homes - Spring Hill</u>										
Townhomes ²	(2)	181	D.U.	17	84	101	97	48	145	1,575
<u>Pulte Homes - Laurel Hill</u>										
Single Family Detached	210	582	D.U.	104	313	417	336	189	525	5,240
Residential Condominium/Townhouse	N/A	150	D.U.	12	59	71	80	40	120	1,305
Elementary School	520	500	Students	96	66	162	-	-	-	535
Subtotal				212	438	650	416	229	645	7,080

Notes:

1 Vehicle trips generated using Institute of Transportation Engineers (ITE) Trip Generation, Seventh Edition.

2 Trip generation for townhomes based on Fairfax County rates presented in "Recommended Contents of Traffic Impact Studies".

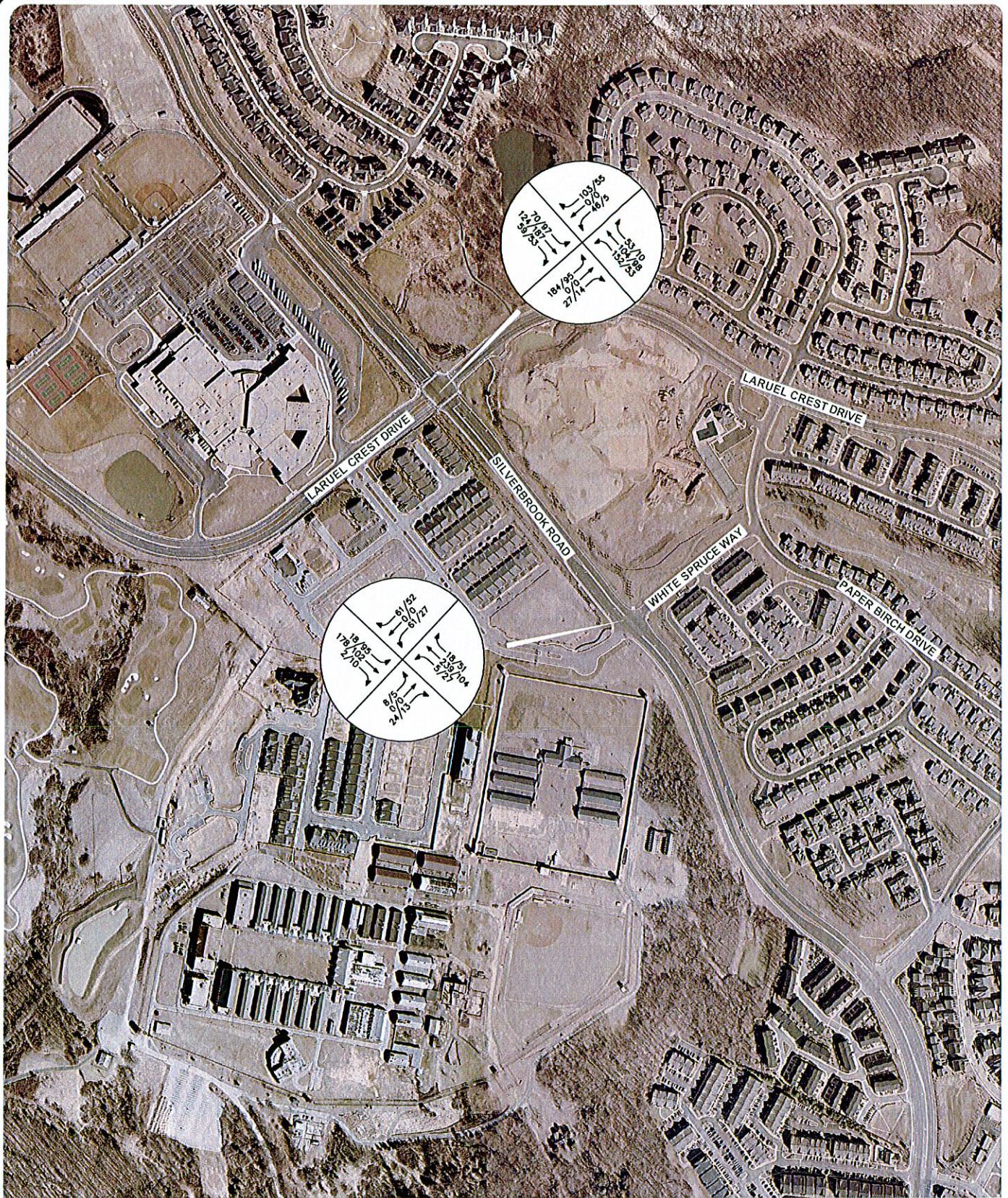


Figure 7
Total Pipeline Development Trips

AM PEAK HOUR
000/000
PM PEAK HOUR





Figure 8
2012 Background Future Traffic Forecasts

AM PEAK HOUR
000/000
PM PEAK HOUR



Table 2

Lorton Town Center

2012 Background Future Levels of Service Summary (1) (2) (3)

Intersection	Traffic Control	Lane Group	2012 Background Future Weekday	
			AM	PM
1. Silverbrook Road/ Laurel Crest Drive	Signal	EBL	D (30.9)	C (32.7)
		EBT	-	-
		EBR	D (38.1)	D (37.4)
		WBL	C (34.0)	D (41.3)
		WBTR	D (42.6)	D (43.5)
		NBL	B (14.0)	B (12.3)
		NBT	C (20.3)	B (17.0)
		NBR	B (17.8)	B (14.7)
		SBL	B (16.2)	A (9.7)
		SBT	C (23.5)	B (17.1)
		<u>SBR</u>	<u>B (19.5)</u>	<u>B (13.0)</u>
		Overall	C (23.9)	B (18.9)
2. Silverbrook Road/ White Spruce Way	STOP	EBLT	D [27.1]	E [38.4]
		EBR	A [9.4]	A [9.5]
		WBLTR	D [33.7]	C [24.6]
		NBL	A [8.5]	A [8.9]
		SBL	A [8.9]	A [9.0]

Notes:

(1) Analysis performed using Synchro software, version 7

(2) Values in parentheses, (), represent signalized delay in seconds

(3) Values in brackets, [], represent unsignalized delay in seconds

Table 3
Lorton Town Center
Site-Generated Trip Generation Summary¹

Land Use	Land Use Code	Amount	Unit	Weekday						Average Daily Traffic
				AM Peak Hour			PM Peak Hour			
				In	Out	Total	In	Out	Total	
Retail	820	59,000	GSF	70	44	114	212	230	442	4,819
	Internal Synergy ^{2,3}			<u>4</u>	<u>2</u>	<u>6</u>	<u>23</u>	<u>35</u>	<u>58</u>	<u>650</u>
	External Vehicle Trips			66	42	108	189	195	384	4,169
	25% Pass-By Trips ⁴			<u>17</u>	<u>11</u>	<u>27</u>	<u>47</u>	<u>49</u>	<u>96</u>	<u>1,042</u>
	New Vehicle Trips			49	31	81	142	146	288	3,127
Residential										
	Townhomes ⁵	153	D.U.	15	71	86	82	40	122	1,331
	Apartments	<u>198</u>	<u>D.U.</u>	<u>20</u>	<u>81</u>	<u>101</u>	<u>83</u>	<u>44</u>	<u>127</u>	<u>1,340</u>
	Subtotal	351	D.U.	35	152	187	165	84	249	2,671
	Internal Synergy ^{2,3}			<u>3</u>	<u>12</u>	<u>15</u>	<u>31</u>	<u>19</u>	<u>50</u>	<u>497</u>
Office	External Vehicle Trips			32	140	172	134	65	199	2,174
	710	114,000	GSF	183	25	208	35	171	206	1,476
Internal Synergy ^{2,3}			<u>8</u>	<u>1</u>	<u>9</u>	<u>7</u>	<u>7</u>	<u>14</u>	<u>183</u>	<u>1,293</u>
			175	24	199	28	164	192		
Total Site Generated Trips										
Total Internal Trips				288	221	509	412	485	897	8,966
Total Pass-By Trips				15	15	30	61	61	122	1,330
Total New External Trips				17	11	27	47	49	96	1,042
				256	195	452	304	375	679	6,594

Notes:

Vehicle trips generated using Institute of Transportation Engineers (ITE) Trip Generation, Seventh Edition.

2 Weekday AM peak hour internal synergy based on rates presented in VDOT's Traffic Impact Analysis Regulations Administrative Guidelines.

3 Weekday PM peak hour and average daily weekday internal synergy based on rates presented in Institute of Transportation Engineers (ITE) Trip Generation Handbook.

4 Pass-by rate based on VDOT recommendations for shopping centers as presented in Traffic Impact Analysis Regulations Administrative Guidelines.

\$ Trip generation for townhomes based on Fairfax County rates presented in "Recommended Contents of Traffic Impact Studies"

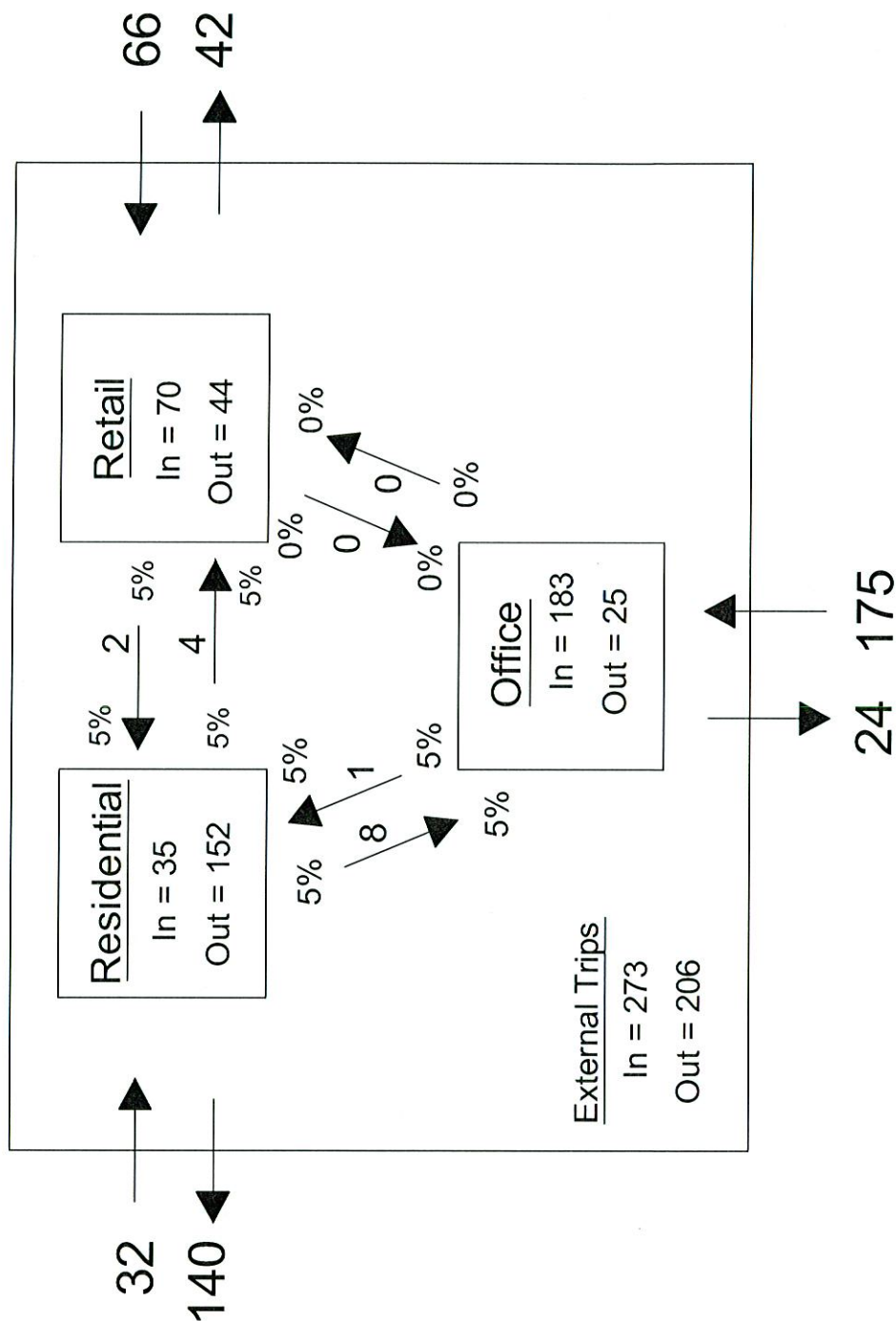


Figure 9
Weekday AM Peak Hour Internal Trips



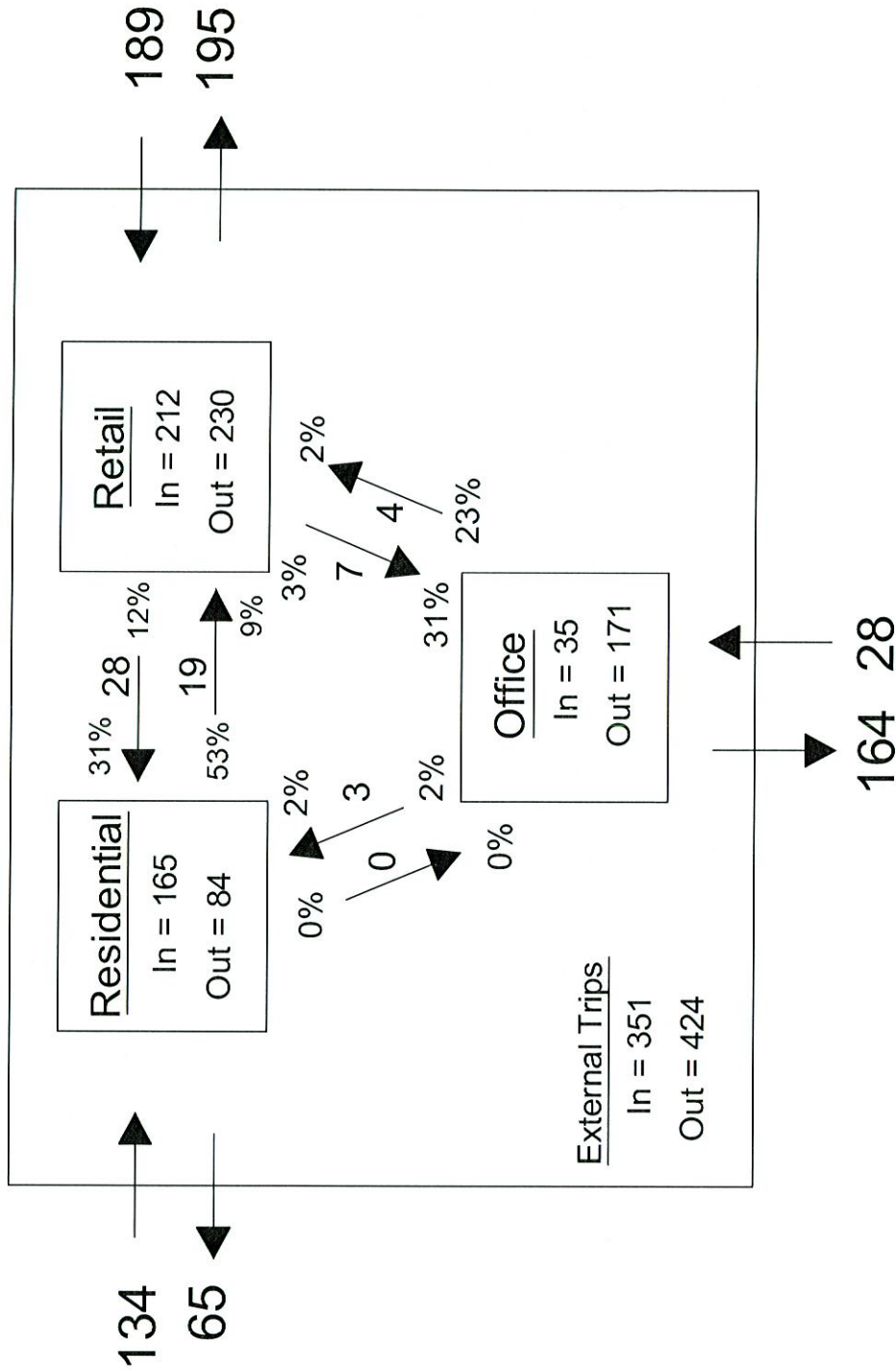


Figure 10
Weekday Daily Peak Hour Internal Trips



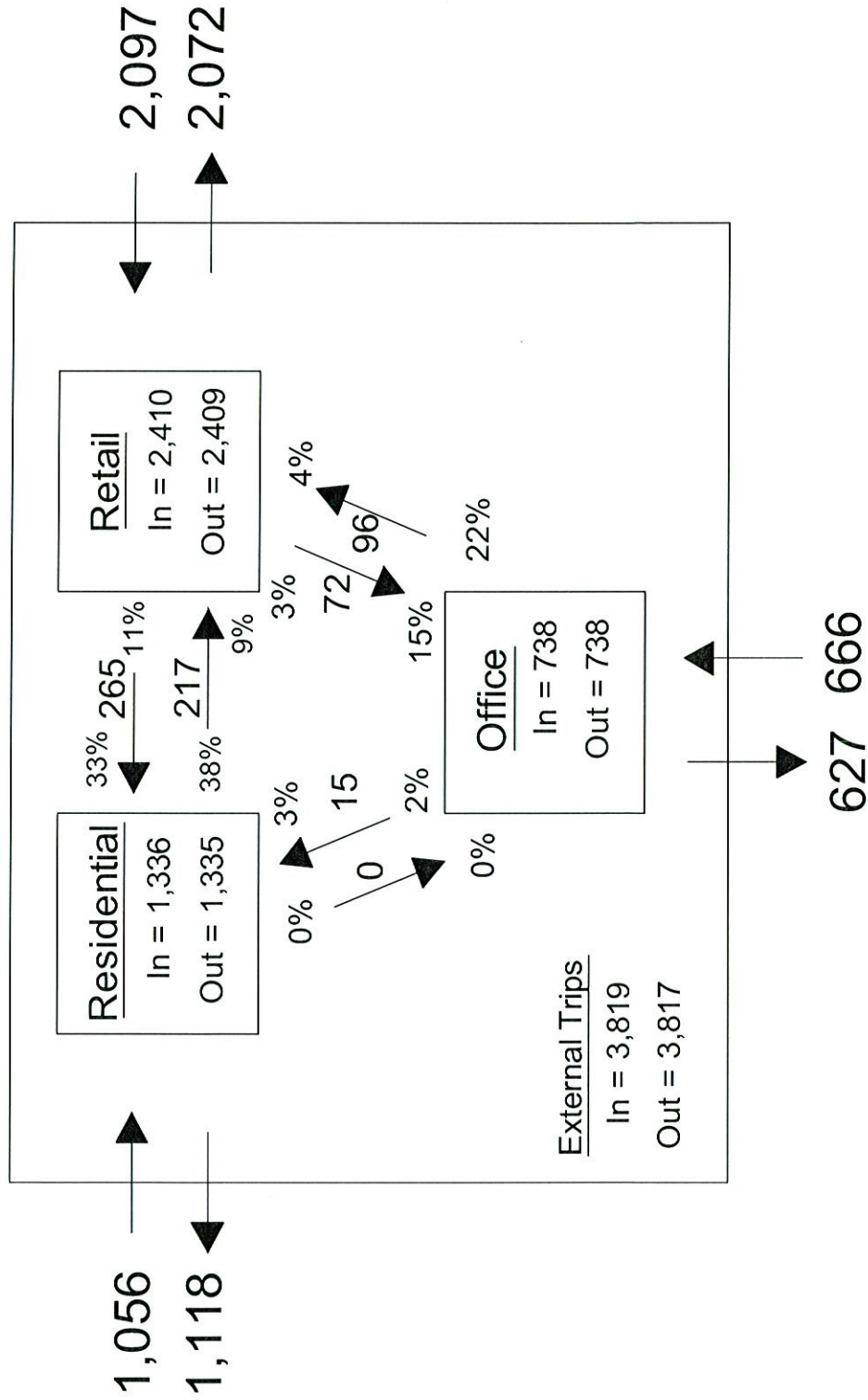


Figure 11
Average Daily Weekday Internal Trips



Pass-by trips are those trips that are made as intermediate stops on the way to a primary destination. An example of a pass-by trip would be one in which a driver stops at the retail center on his/her way home from work. In this case, a driver already on Silverbrook Road may “divert” from the arterial to visit the retail uses at the proposed town center. Based on VDOT recommendations, a 25 percent pass-by trip adjustment was applied to the retail trip generation.

As shown in Table 3, the proposed mixed use center would generate 452 new AM peak hour trips, 679 new PM peak hour trips, and 6,594 new average daily trips upon completion.

TRIP DISTRIBUTION

These site-generated trips were assigned to the public road network as follows, based on a review of existing travel patterns, local knowledge, and engineering judgment:

<u>Location</u>	<u>Retail / Office / Residential</u>
a. To/From the north on Silverbrook Road	54% / 30% / 50%
b. To/From the south on Silverbrook Road	32% / 60% / 40%
c. To/From the west on Laurel Crest Drive	10% / 10% / 10%
d. To/From the east on Laurel Crest Drive	2% / 0% / 0%
e. To/From the east on White Spruce Way	2% / 0% / 0%

The resulting site-generated traffic was assigned to the roadway network based on these three (3) access scenarios:

1. One full-movement entrance on Silverbrook Road
2. One full-movement entrance and one right-in, right-out entrance on Silverbrook Road
3. Two full movement entrances on Silverbrook Road

The total site trips for each scenario are shown on Figures 12 through 14.

TOTAL FUTURE TRAFFIC FORECASTS

The site-generated traffic shown on Figures 12 to 14 was combined with the background future traffic forecasts shown on Figure 6 to yield the total future traffic forecasts associated with each of the three access scenarios. The resulting total future traffic forecasts are shown on Figures 15 through 17.

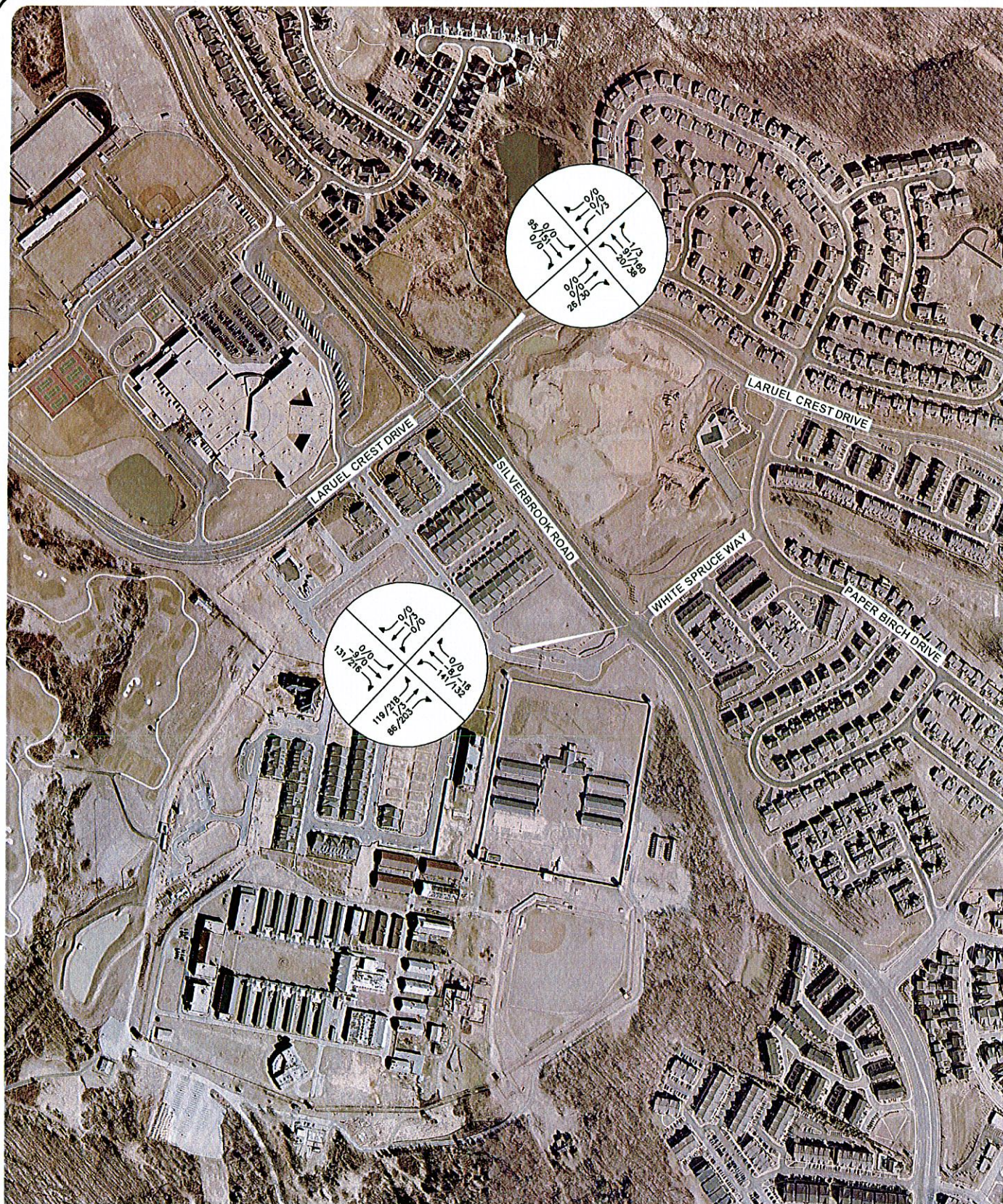


Figure 12
Total Site-Generated Trips and Pass-By Trips
One Full-Movement Entrance on Silverbrook Road

AM PEAK HOUR
PM PEAK HOUR
000/000



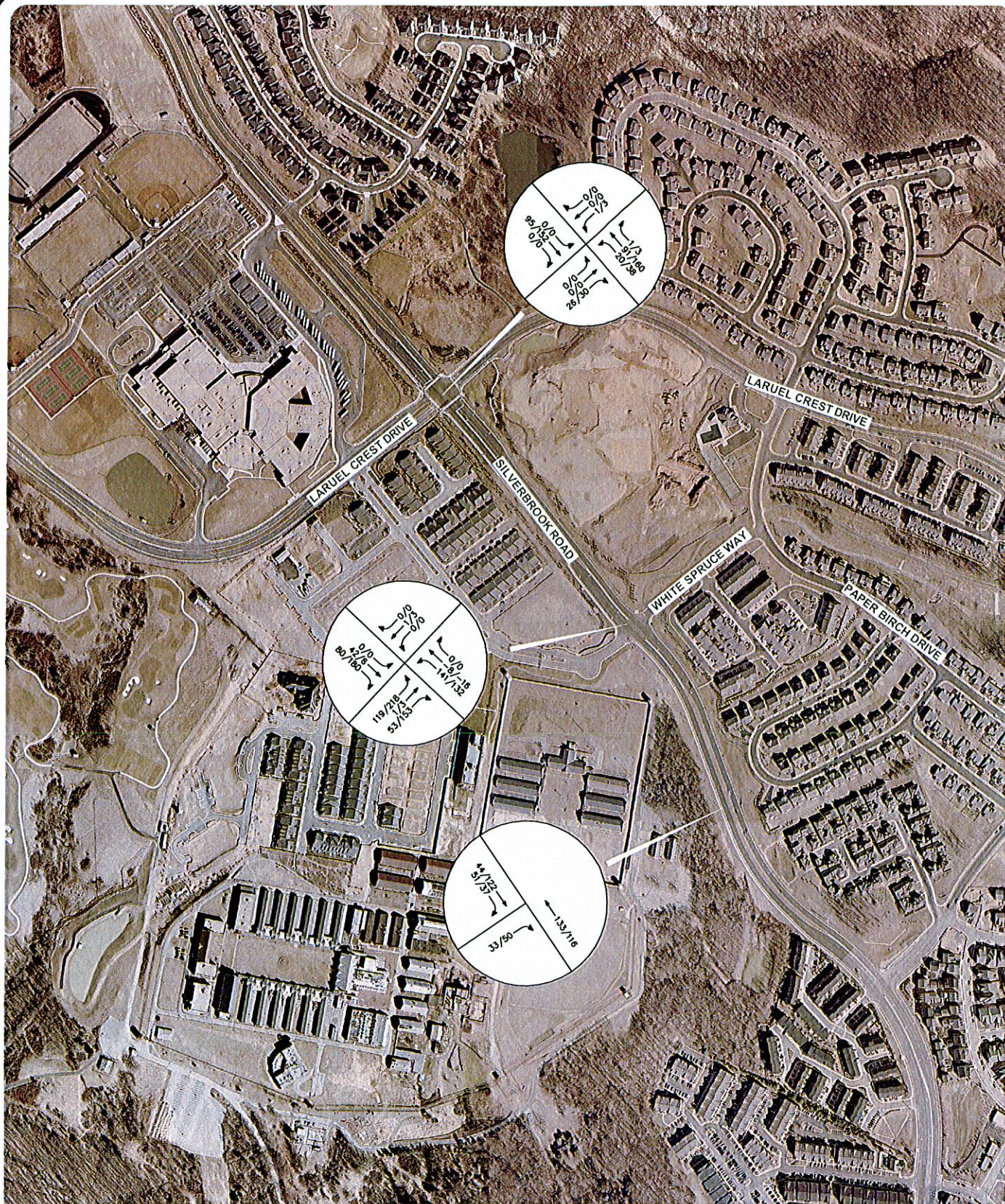


Figure 13
Total Site-Generated Trips and Pass-By Trips
One Full-Movement, One Right-In/Right-Out Entrance

AM PEAK HOUR
000/000
PM PEAK HOUR



North

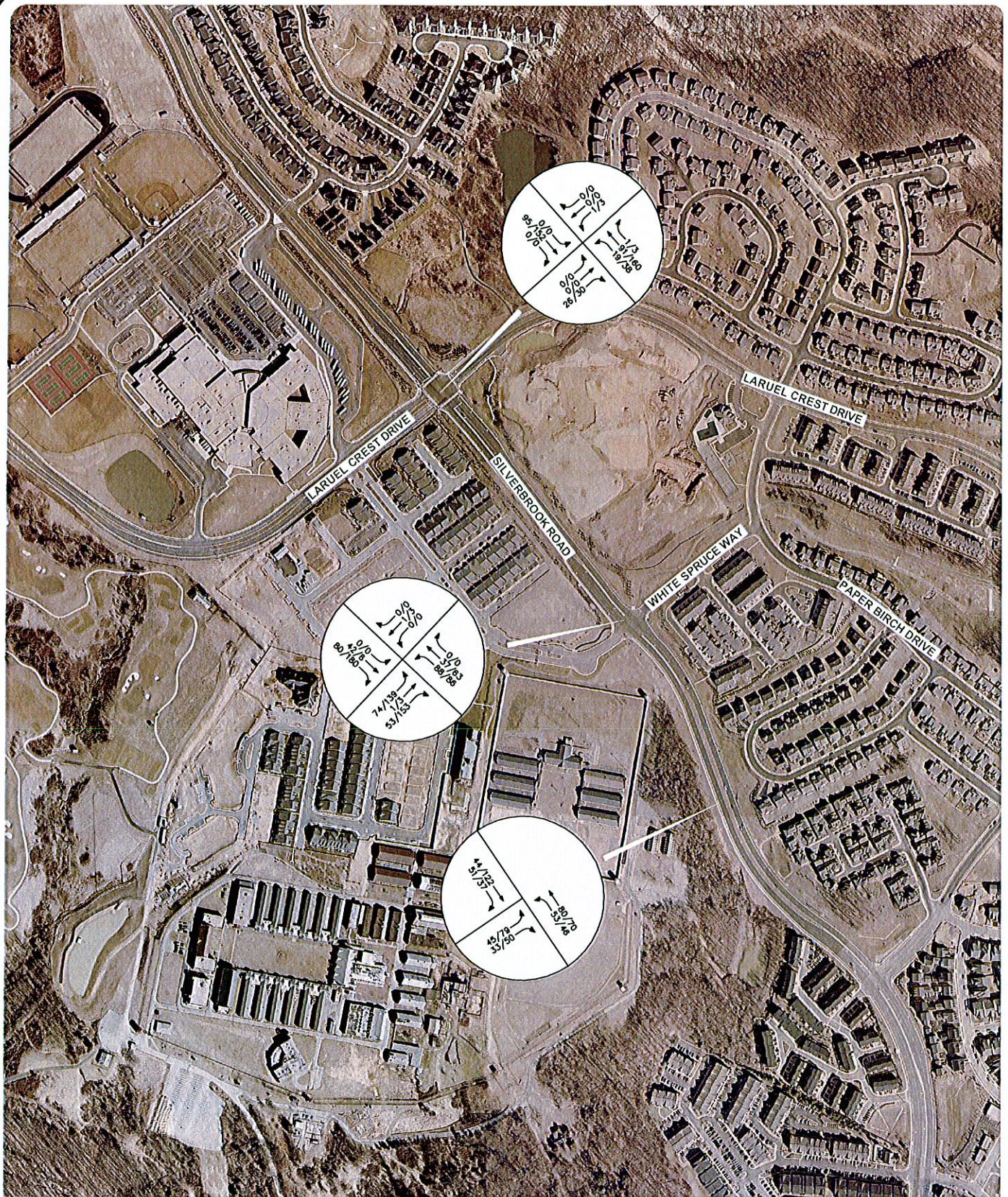


Figure 14
Total Site-Generated Trips and Pass-By Trips
Two Full-Movement Entrances

AM PEAK HOUR
PM PEAK HOUR
000/000



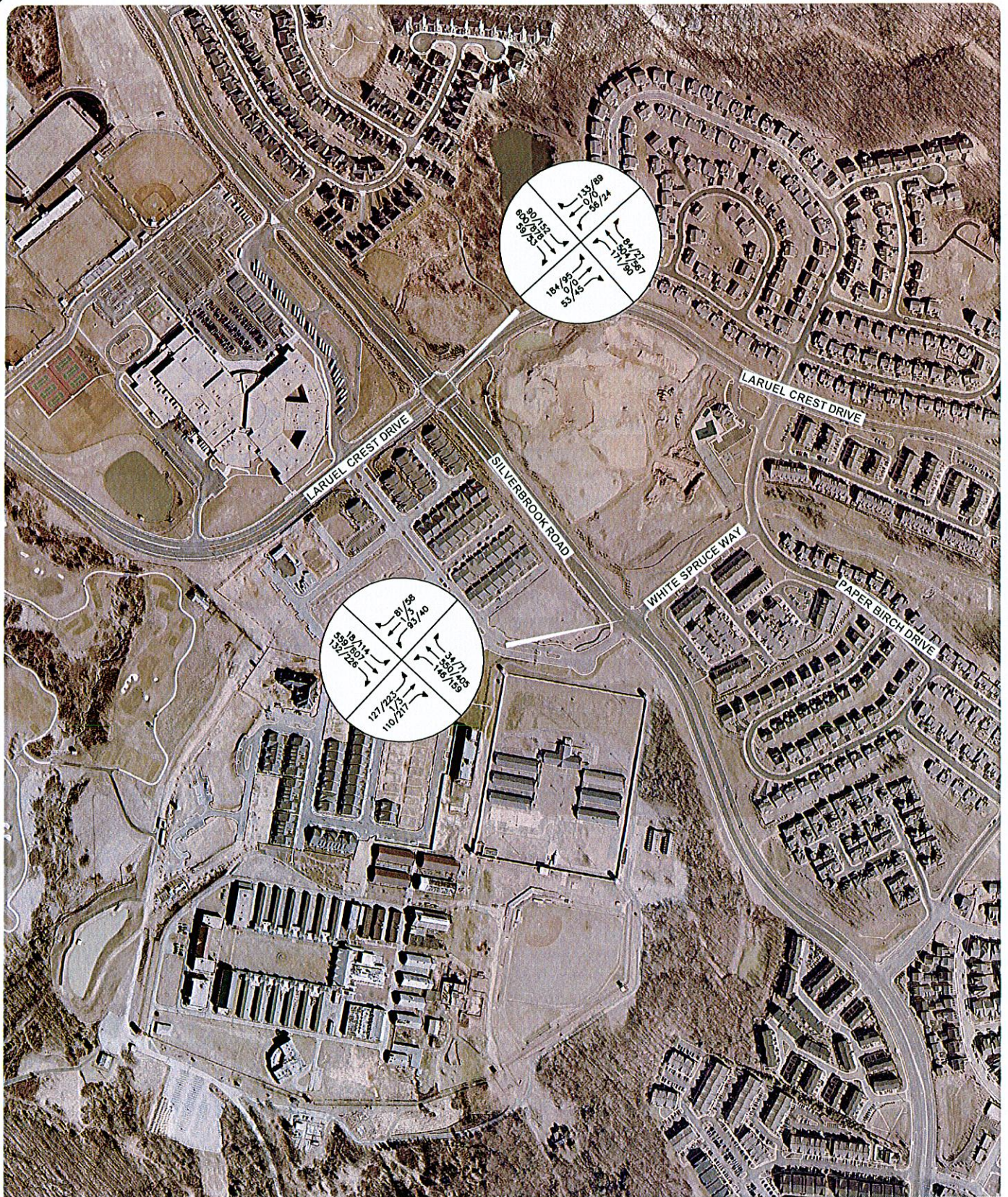


Figure 15
2012 Total Future Traffic Volumes
One Full-Movement Entrance on Silverbrook Road

AM PEAK HOUR
PM PEAK HOUR
000/000



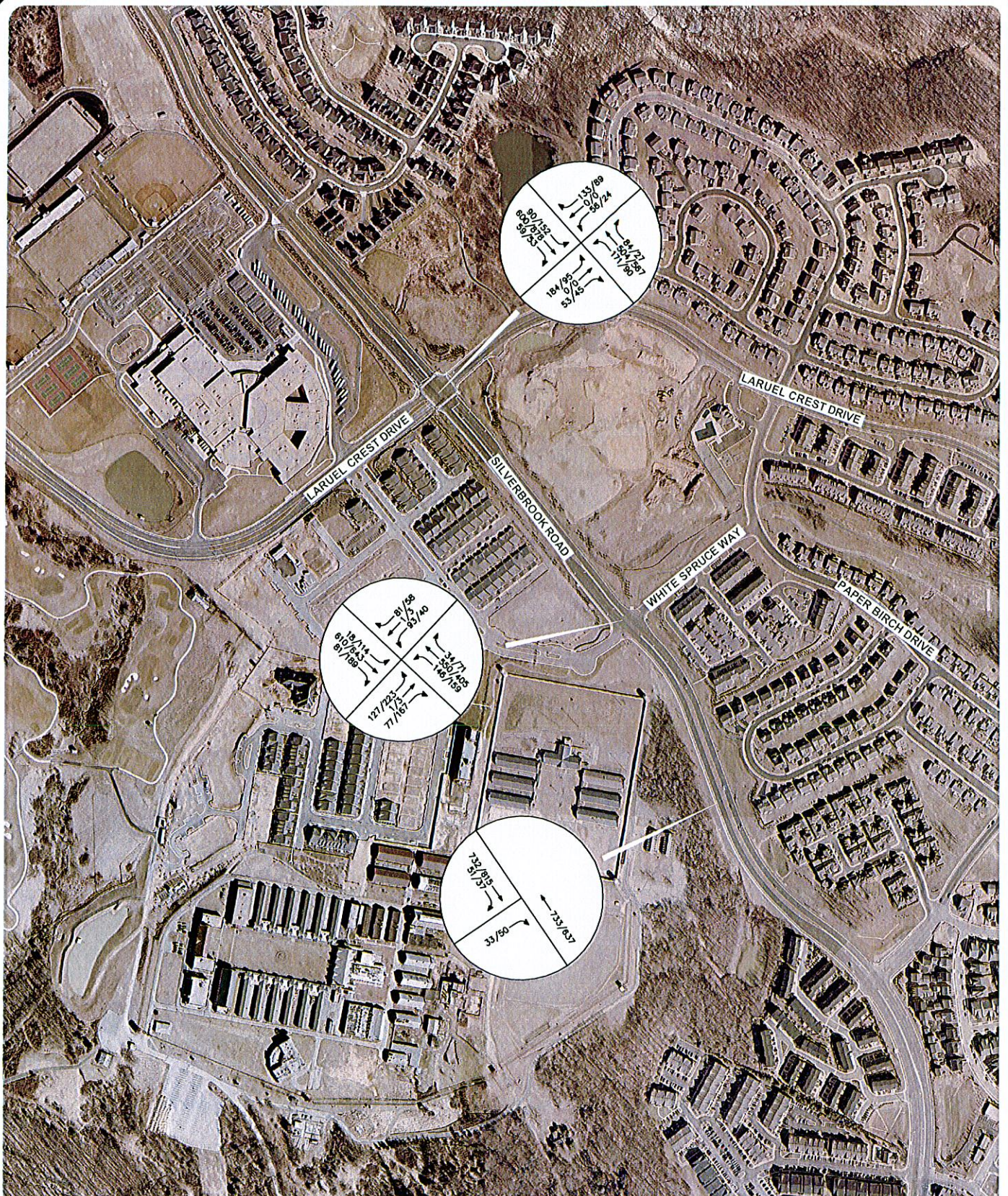


Figure 16
2012 Total Future Traffic Volumes
One Full-Movement, One Right-In/Right-Out Entrance

AM PEAK HOUR
PM PEAK HOUR
000/000



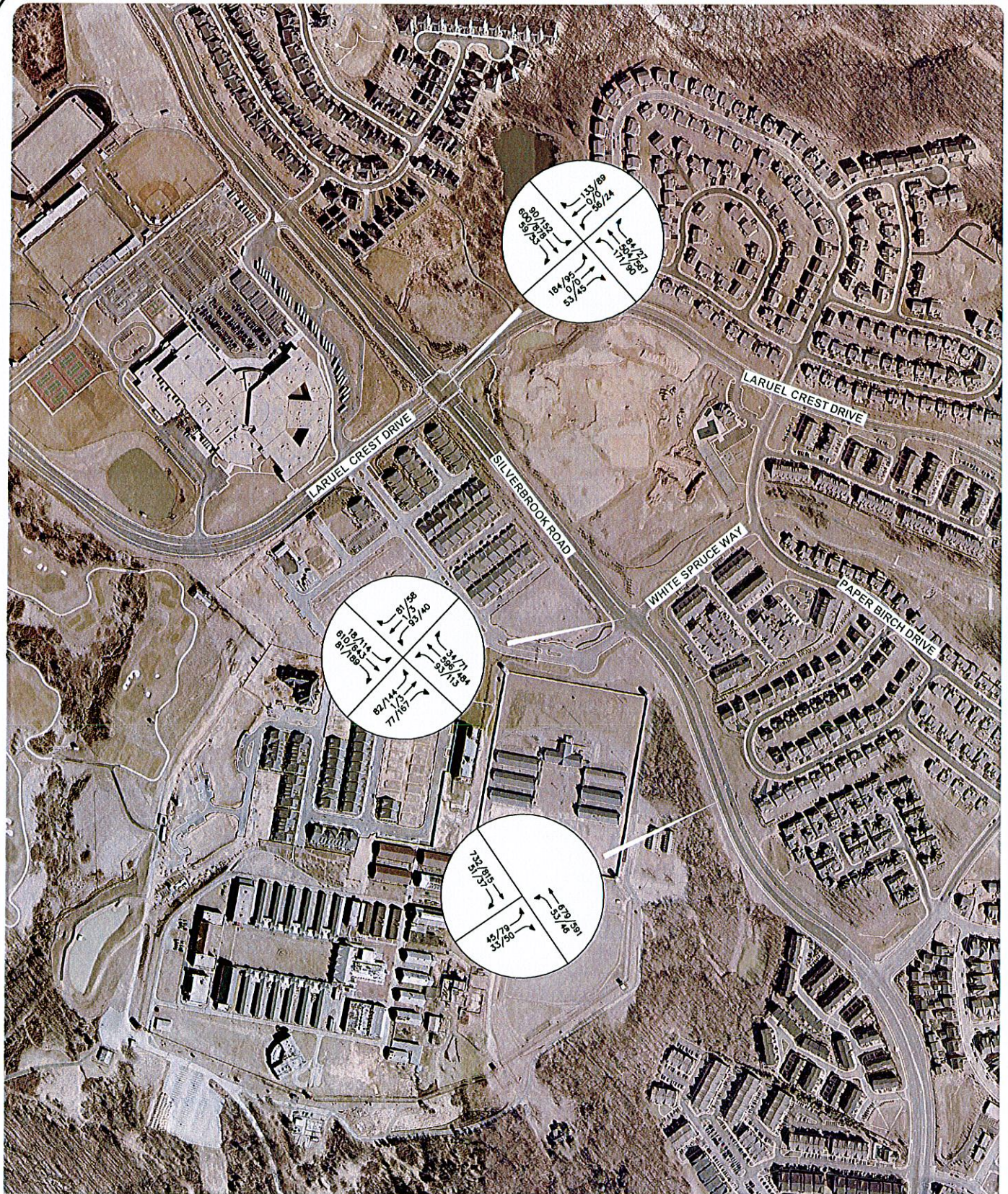


Figure 17
2012 Total Future Traffic Volumes
Two Full-Movement Entrances

AM PEAK HOUR
PM PEAK HOUR
000/000



TOTAL FUTURE LEVELS OF SERVICE

Total future peak hour levels of service were calculated based on: (1) the total future traffic forecasts; (2) the future lane use and traffic controls; and (3) the Highway Capacity Manual 2000 (HCM) methodologies for unsignalized and signalized intersections (Synchro version 7.0). The results are summarized in Table 4.

CONCLUSIONS:

1. **One Full-Movement Entrance on Silverbrook Road.** Under this scenario, all site-generated traffic would be focused on a single driveway on Silverbrook Road, opposite White Spruce Way.

The existing signalized Silverbrook Road/Laurel Crest Drive intersection would operate at an acceptable overall level of service (LOS "C") during both weekday peak hours; all lane groups would operate at an acceptable LOS "D" or better.

Eastbound and westbound through/left turn movements from White Spruce Way onto Silverbrook Road would operate at capacity at LOS "F" during both the AM and PM peak hours under STOP sign control due to relatively high traffic volumes on Silverbrook Road.

The Silverbrook Road/White Spruce Way intersection would operate at an acceptable overall LOS "C" during both the AM and PM peak hours, and all lane groups would operate at an acceptable LOS "D" or better, if a new traffic signal were installed at this intersection.

As shown in Table 5, the existing turn-bays on Silverbrook Road would provide adequate storage for future inbound traffic; however, the 200 feet of stacking space that would be provided on eastbound White Spruce Road would not adequately accommodate outbound queues from the Town Center, even if a new traffic signal were installed at the Silverbrook Road/White Spruce Way intersection.

2. **One Full-Movement Entrance and One Right-In, Right-Out Entrance on Silverbrook Road.** Under this scenario, eastbound traffic on Silverbrook Road would be distributed between two intersections on Silverbrook Road (at White Spruce Way and the second site driveway) rather than focused on a single access point (White Spruce Way). This would not solve the outbound queuing problem identified in the single-driveway scenario, however.

Like the previous scenario, the existing signalized Silverbrook Road/Laurel Crest Drive intersection would continue to operate at an acceptable overall level of service (LOS "C") during both weekday peak hours; all lane groups would operate at an acceptable LOS "D" or better.

Table 4
Lorton Town Center
2012 Total Future Levels of Service Summary (1) (2) (3) (4)

Intersection	Traffic Control	Lane Group	2012 Total Future (1 Full Movement) Weekday		2012 Total Future (1 Full Movement, 1 RIRO) Weekday		2012 Total Future (2 Full Movement) Weekday	
			AM	PM	AM	PM	AM	PM
1. Silverbrook Road/ Laurel Crest Drive	Signal	EBL	C (32.5)	C (34.2)	C (32.5)	C (34.2)	C (32.5)	C (34.2)
		EBT	-	-	-	-	-	-
		EBR	D (36.2)	D (38.3)	D (36.2)	D (38.3)	D (36.2)	D (38.3)
		WBL	D (40.0)	D (41.3)	D (40.0)	D (41.3)	D (40.0)	D (41.3)
		WBTR	D (44.0)	D (43.5)	D (44.0)	D (43.5)	D (44.0)	D (43.5)
		NBL	B (13.3)	B (12.7)	B (13.3)	B (12.7)	B (13.3)	B (12.7)
		NBT	B (19.6)	B (17.9)	B (19.6)	B (17.9)	B (19.6)	B (17.9)
		NBR	B (16.6)	B (14.4)	B (16.6)	B (14.4)	B (16.6)	B (14.4)
		SBL	B (15.3)	B (10.3)	B (15.3)	B (10.3)	B (15.3)	B (10.3)
		SBT	C (23.3)	B (18.9)	C (23.3)	B (18.9)	C (23.3)	B (18.9)
		SBR	B (18.5)	B (13.2)	B (18.5)	B (13.2)	B (18.5)	B (13.2)
		Overall	C (23.8)	C (20.0)	C (23.8)	C (20.0)	C (23.8)	C (20.0)
2. Silverbrook Road/ White Spruce Way <i>Improvements: Signalization</i>	STOP	EBLT	F [409.9]	F [*]	F [442.8]	F [*]	F [135.6]	F [899.4]
		EBR	B [10.4]	B [13.1]	A [9.9]	B [11.4]	A [9.9]	B [11.4]
		WBLTR	F [302.0]	F [405.1]	F [231.3]	F [251.1]	F [156.7]	F [215.7]
		NBL	A [9.9]	B [11.2]	A [9.8]	B [11.0]	A [9.4]	B [10.5]
		SBL	A [8.9]	A [8.9]	A [8.9]	A [8.9]	A [9.1]	A [9.3]
	Signal	EBLT	D (46.3)	D (50.5)	D (46.3)	D (51.6)	D (44.3)	D (47.9)
		EBR	D (38.6)	D (35.0)	D (38.5)	C (34.8)	D (40.5)	C (38.2)
		WBLTR	D (48.7)	D (44.6)	D (48.7)	D (44.6)	D (47.6)	D (44.6)
		NBL	C (21.1)	C (30.6)	C (22.4)	C (30.7)	B (16.8)	C (31.5)
		NBTR	C (21.7)	C (29.0)	C (21.9)	C (29.2)	B (17.6)	C (27.0)
		SBL	B (15.1)	C (21.7)	B (14.5)	C (21.6)	B (13.1)	C (20.2)
		SBT	B (17.4)	C (23.9)	B (16.7)	C (24.2)	B (15.3)	C (22.0)
		SBR	B (11.9)	C (34.5)	B (10.9)	C (33.5)	B (10.4)	C (33.5)
		Overall	C (24.8)	C (31.5)	C (24.6)	C (31.4)	C (21.6)	C (29.2)
	STOP	EBL	N/A	N/A	N/A	N/A	E [41.6]	F [64.0]
		EBR	N/A	N/A	B [11.4]	B [12.1]	B [11.4]	B [12.1]
		NBL	N/A	N/A	N/A	N/A	A [10.0]	B [10.3]
	Signal	EBL	N/A	N/A	N/A	N/A	D (46.4)	D (47.4)
		EBR	N/A	N/A	N/A	N/A	D (43.3)	D (41.7)
		NBL	N/A	N/A	N/A	N/A	A (3.0)	A (3.7)
		NBT	N/A	N/A	N/A	N/A	A (3.2)	A (3.6)
		SBT	N/A	N/A	N/A	N/A	A (2.4)	A (2.2)
		SBR	N/A	N/A	N/A	N/A	A (0.6)	A (0.1)
		Overall	N/A	N/A	N/A	N/A	A (4.8)	A (6.1)
3. Silverbrook Road/ South Entrance <i>Improvements: Signalization</i>	STOP	EBL	N/A	N/A	N/A	N/A	E [41.6]	F [64.0]
		EBR	N/A	N/A	B [11.4]	B [12.1]	B [11.4]	B [12.1]
		NBL	N/A	N/A	N/A	N/A	A [10.0]	B [10.3]
	Signal	EBL	N/A	N/A	N/A	N/A	D (46.4)	D (47.4)
		EBR	N/A	N/A	N/A	N/A	D (43.3)	D (41.7)
		NBL	N/A	N/A	N/A	N/A	A (3.0)	A (3.7)
		NBT	N/A	N/A	N/A	N/A	A (3.2)	A (3.6)
		SBT	N/A	N/A	N/A	N/A	A (2.4)	A (2.2)
		SBR	N/A	N/A	N/A	N/A	A (0.6)	A (0.1)
		Overall	N/A	N/A	N/A	N/A	A (4.8)	A (6.1)

Notes:

- (1) Analysis performed using Synchro software, version 7
- (2) Values in parentheses, (), represent signalized delay in seconds
- (3) Values in brackets, [], represent unsignalized delay in seconds
- (4) Delay exceeds 1,000 seconds.

Table 5
Lorton Town Center
Total Future Queuing Analysis (1)

Intersection	Control	Lane Group	Available Storage (2)	95th Percentile Queues (feet)			95th Percentile Queues (feet)			95th Percentile Queues (feet)			Adequate Yes/No
				(1 Full Movement)			(1 Full Movement, 1 Right-in, Right-Out)			(2 Full Movement)			
				Weekday	PM	Adequate Yes/No	Weekday	PM	Adequate Yes/No	Weekday	AM	PM	
1. Silverbrook Road/ Laurel Crest Drive	Signal	EBR	225	0	0	Yes	0	0	Yes	0	0	Yes	Yes
		NBL	440	84	42	Yes	84	42	Yes	84	84	42	Yes
		NBR	255	29	16	Yes	29	16	Yes	29	29	16	Yes
		SBL	215	48	66	Yes	48	66	Yes	48	48	66	Yes
		SBR	320	27	21	Yes	27	21	Yes	27	27	21	Yes
2. Silverbrook Road/ White Spruce Way	STOP	EBLT	200	282	*	No	290	*	No	128	404	No	
		EBR	200	13	39	Yes	8	23	Yes	8	24	Yes	
		NBL	250	16	22	Yes	16	21	Yes	9	14	Yes	
		SBL	250	2	10	Yes	2	10	Yes	2	11	Yes	
		SBR	275	0	0	Yes	0	0	Yes	0	0	Yes	
Improvements: Signalization	Signal	EBLT	200	143	235	No	143	235	No	101	163	Yes	
		EBR	200	49	63	Yes	42	56	Yes	42	59	Yes	
		NBL	250	138	147	Yes	148	71	Yes	71	124	Yes	
		SBL	250	13	84	Yes	13	85	Yes	13	84	Yes	
		SBR	275	24	82	Yes	17	73	Yes	17	73	Yes	
3. Silverbrook Road/ South Entrance	STOP	EBLT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	34	80	N/A	
		EBR	N/A	N/A	N/A	N/A	5	8	N/A	5	8	N/A	
		NBL	N/A	N/A	N/A	N/A	N/A	6	N/A	6	5	N/A	
		SBR	N/A	N/A	N/A	N/A	0	0	N/A	0	0	N/A	
		Improvements: Signalization	EBLT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	65	98	N/A
EBR	N/A	N/A	N/A	N/A	N/A	30	N/A	30	35	N/A			
NBL	N/A	N/A	N/A	N/A	N/A	17	N/A	17	18	N/A			
SBR	N/A	N/A	N/A	N/A	N/A	2	N/A	2	0	N/A			

Notes:

- (1) Analysis performed using Synchro software, version 7. (95th Percentile Queue)
- (2) "Available Storage" includes full-length turn bay.
- (3) No queue length reported by Synchro.

Like the previous scenario, eastbound and westbound through/left turn movements from White Spruce Way onto Silverbrook Road would operate at capacity at LOS "F" during both the AM and PM peak hours under STOP sign control due to relatively high traffic volumes on Silverbrook Road.

The Silverbrook Road/White Spruce Way intersection would operate at an acceptable overall LOS "C" during both the AM and PM peak hours, and all lane groups would operate at an acceptable LOS "D" or better, if a new traffic signal were installed at this intersection.

Like the previous scenario, the existing turn-bays on Silverbrook Road would provide adequate storage for future inbound traffic; however, the 200 feet of stacking space that would be provided on eastbound White Spruce Road would not adequately accommodate outbound queues from the Town Center, even if a new traffic signal were installed at the Silverbrook Road/White Spruce Way intersection.

3. **Two Full-Movement Entrances on Silverbrook Road.** Under this scenario, traffic on both eastbound and westbound Silverbrook Road would be distributed between two driveways. This would solve the queuing problem identified in the previous scenarios, if both driveways were signalized.

The existing signalized Silverbrook Road/Laurel Crest Drive intersection would continue to operate at an acceptable overall level of service (LOS "C") during both weekday peak hours; all lane groups would operate at an acceptable LOS "D" or better.

Like the previous scenarios, eastbound and westbound through/left turn movements from White Spruce Way onto Silverbrook Road would operate at capacity at LOS "F" during both the AM and PM peak hours under STOP sign control due to relatively high traffic volumes on Silverbrook Road. The Silverbrook Road/White Spruce Way intersection would operate at an acceptable overall LOS "C" during both the AM and PM peak hours, and all lane groups would operate at an acceptable LOS "D" or better, if a new traffic signal were installed at this intersection.

Like the previous scenarios, the existing turn-bays on Silverbrook Road would provide adequate storage for future inbound traffic; however, the 200 feet of stacking space that would be provided on eastbound White Spruce Road would not adequately accommodate outbound queues from the Town Center under STOP control. Two hundred feet of staking distance would adequately accommodate projected queues during both the AM and PM peak hour under signal control.

The Virginia Department of Transportation (VDOT) requires a minimum of 600 feet, and desirably 700 feet, of separation between median breaks on highways with a 40 mph design speed (see Attachment I). The proposed site plan apparently meets the desirable 700-foot spacing criterion.

4. Plans for Lorton Town Center show possible future connectors to Laurel Crest Drive and Lorton Road; however, these additional connections are **not required** to support the proposed re-development of the subject site as the Lorton Town Center. Access to Silverbrook Road alone would adequately accommodate full buildout of Lorton Town Center, as envisioned by The Alexander Company.

Attachment I
VDOT Crossover Criteria

APPENDIX C

SECTION C-1-DESIGN FEATURES

CROSSOVER SPACING

Criteria Table C-1-1 shows crossover spacing and sight distance requirements to be applied on all divided highways without full control of access. The minimum sight distance requirement indicated in Table C-1-1 must be met at all crossover locations. Crossover spacing less than shown as minimum will be considered when required by intersecting public highways or streets with a current ADT of 100 or greater. Other crossovers will only be allowed after an individual traffic safety and operational study.

The following are some factors, but not all inclusive, that should be considered in the study, if applicable: Operating speed, volume of traffic for crossover and through routes, signal operation/progression, accidents with and without additional crossover, number of U-turns, weaving maneuvers, alternative solution, capacity analysis, type of vehicles such as school buses, trucks, etc. Final approval will be required by the State Traffic Engineer and the State Location and Design Engineer.

DESIGN SPEED of HIGHWAY (MPH)	CROSSOVER SPACING⊗		MINIMUM SIGHT DISTANCE (FEET)
	DESIRABLE (FEET)	MINIMUM (FEET)	
70	1250	1000	825
60	1100	900	710
55	1000	800	650
50	900	700	590
45	800	650	530
40	700	600	475
35	600	500	415

Source: Based on NCHRP Report 348

TABLE C-1-1 CROSSOVER SPACING CRITERIA

Sight distance determinations apply both horizontally and vertically and are to be based on a height of driver's eye of 3.5' and a height of object 3.5' measured each way.

⊗ Crossover spacing is measured from center to center.